Claims

1. A method for one-piece injection moulding of a soft needle catheter comprising a hub and a tube-shaped flexible part, comprising the steps of:

- feeding a molten polymer into a mould comprising a core which together define a cavity composed of a hub cavity and a tube-shaped cavity, said core having a cone-shaped part and a cylindrical part, said core being used to form the interior of the catheter;
- removing the core from the catheter when the polymer has been sufficiently cured for the core to be removed; and
- removing the catheter from the mould when the polymer has been sufficiently cured to be removed;

characterized in using a core wherein the cone-shaped part of the core forms at least a part of the interior of the hub and extends into the tube-shaped cavity so as to form an interior of the tube-shaped flexible part being at least partially cone shaped.

2. A method according to claim 1, wherein the catheter is cured to it final state in the mould.

3. A method according to claim 1 or 2, wherein the molten polymer is supplied to the mould via at least two inlets preferably the inlets are placed symmetrically around the axis of the core.

4. A method according to any one of claims 1 to 3, wherein the inlets are placed at the hub forming part of the mould.

5. A method according to any one of claims 1 to 4, wherein the mould separates along the axis of the tube-shaped part.

6. A method according to any one of claims 1 to 4, wherein the mould separates perpendicular to the tube-shaped part and at or just below the hub.

7. A method according to any one of claims 1 to 6, wherein the polymer is chosen from polyester ethers, ECDEL, styrene based TPE, olefin based TPE, urethane based TPE, ester based TPE, amid based TPE polyolifines and silicone rubbers.

8. A method according to any one of claims 1 to 6, wherein the polymer is selected from the group consisting of polypropylene, C-FLEX™, mixtures of C-FLEX™ and polypropylene, LUPOLEN™ 1840H, LUPOLEN™ 3020D, PELLETHANE ™ 2363-75D, PELLETHANE™ 2363-55D, TECOTHANE ™ and CARBOTHANE™.

9. A method according to any one of claims 1 to 8, wherein the polymer has a shore between 40 and 60D.

10. A method according to any one of claims 1 to 9, wherein more than one polymer is used in the method.

11. A soft needle catheter comprising a hub and a tube-shaped flexible part having a first end and a second end, the hub and the tube-shape flexible part being in one piece and being connected at the first end of the tube-shaped flexible part, characterized in that the interior tube-shaped part has both a cone-shaped part and a cylindrical part, the cylindrical part being placed at the second end of the tube-shaped flexible part.

12. A soft needle catheter according to claim 11, wherein the hub is fitted with means for assisting the removal of the catheter from the patient, preferably in form a flap, a rim or a groove.

13. A soft needle catheter according to any one of claims 11 or 12, wherein the hub is fitted with at least one carving, preferably two carvings placed opposing each other.

14. A soft needle catheter according to any one of claims 11 to 13, wherein the hub has means for sealing the hub to a drug delivery device, said means being provided on the outside of the hub in form of at least one round going packing, rim or fin or by having a hub with a cone shaped exterior having a size suitable to fit into a cone shaped cavity of a drug delivery device.

15. A soft needle catheter according to any one of claims 11 to 14, wherein the tube-shaped part of the soft needle catheter has a ratio between the cylindrical part and the cone-shaped part in the range from 10:1 to 1:40, preferably the range is from 5:1 to 1:30, more preferably the range is from 2:1 to 1:20 and most preferably from 1:1 to 1:15.

16. A soft needle catheter according to any one of claims 11 to 15, wherein the cylindrical part is 1.5 mm.

17. A soft needle catheter according to any one of claims 11 to 16, wherein the cylindrical part is rounded.

18. A soft needle catheter according to any one of claims 11 to 17, wherein the polymer is chosen from polyester ethers, ECDEL, styrene based TPE, olefin based TPE, urethane based TPE, ester based TPE, amid based TPE polyolifines and silicone rubbers.

19. A soft needle catheter according to any one of claims 11 to 17, wherein the polymer is selected from the group consisting of polypropylene, C-FLEX™, mixtures of C-FLEX™ and polypropylene, LUPOLEN™ 1840H, LUPOLEN™ 3020D, PELLETHANE ™ 2363-75D, PELLETHANE™ 2363-55D, TECOTHANE ™ and CARBOTHANE™.

20. A soft needle catheter according to any one of claims 11 to 19, wherein the catheter is composed from more than one polymer.

21. A mould for producing a soft needle catheter according to claim 11 comprising a hub cavity, a tube-shaped cavity and a core having a cone-shaped part and a cylindrical part, characterized in that the cone-shaped part of the core extends into the tube-shaped cavity.

22. Use of a catheter according to any one of claims 11 to 20 intravenously or subcutaneously preferably for intravenous or subcutaneous injection of a drug.